

**WHAT IS CLAIMED IS:**

1. A liquid crystal display device, comprising: a liquid crystal layer; a pair of substrates provided so as to interpose the liquid crystal layer therebetween; and a plurality of pixels arranged in a matrix pattern, wherein:

the liquid crystal layer has a helical structure and exhibits at least two stable states including a planar state and a focal conic state according to an applied voltage; and

in each of the plurality of pixels, a thickness  $d$  of the liquid crystal layer has at least two different values, and the liquid crystal layer includes at least two regions having different values of a first threshold voltage for transitioning the liquid crystal layer from the planar state to the focal conic state.

2. The liquid crystal display device of claim 1, wherein the thickness  $d$  of the liquid crystal layer satisfies a relationship of  $1 < d/P < 15$  with a helical pitch  $P$  of the helical structure.

3. The liquid crystal display device of claim 1, wherein the thickness  $d$  of the liquid crystal layer is defined so that  $V_{thFmax}$  is less than  $V_{thHmin}$  in each of the plurality of pixels, where  $V_{thFmax}$  denotes the first threshold voltage for transitioning the liquid crystal layer included in a region with a largest thickness  $d$  of the liquid crystal layer from the planar state to the focal conic state, and  $V_{thHmin}$  denotes a second threshold voltage for

transitioning the liquid crystal layer included in a region with a smallest thickness  $d$  of the liquid crystal layer from the focal conic state to a homeotropic state.

4. The liquid crystal display device of claim 1,  
5 wherein a value of the thickness  $d$  of the liquid crystal layer changes discontinuously across each of the plurality of pixels.

10 5. The liquid crystal display device of claim 4, wherein a difference  $\Delta d$  between the at least two different values of the thickness  $d$  of the liquid crystal layer satisfies a relationship of  $0.5P \leq \Delta d$  with the helical pitch  $P$  of the helical structure.

15 6. The liquid crystal display device of claim 1, wherein a value of the thickness  $d$  of the liquid crystal layer changes continuously across each of the plurality of pixels.

20 7. The liquid crystal display device of claim 1, further comprising a pair of alignment layers provided respectively on the pair of substrates on one side thereof that is closer to the liquid crystal layer, wherein one of the pair of alignment layers is a horizontal alignment layer, and the other one of the pair of alignment layers is a vertical alignment layer.

25 8. The liquid crystal display device of claim 1, wherein at least one of the pair of substrates includes a concave/convex surface on one side thereof that is closer to

the liquid crystal layer.

9. The liquid crystal display device of claim 1,  
wherein the pair of substrates both include a concave/convex  
surface on one side thereof that is closer to the liquid  
5 crystal layer.